



Temperament and Cattle Performance

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*Challenges and Opportunities
of Cow Herd Expansion*

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What is Temperament?

- Behavioral responses of cattle when exposed to human handling
- As cattle temperament worsens
 - Response to human contact becomes more excitable
- Selection for temperament (docility)
 - Heritable trait - Up to $h^2 = 0.50$
 - Mainly for safety reasons
 - Productive implications being established

How to assess temperament?

- Chute Score
 - Cattle are individually restrained in the chute
 - Scored in 1-5 scale according to behavior
 1. Calm with no movement
 2. Restless movement
 3. Frequent movement with vocalization
 4. Constant movement, vocalization, shaking of chute
 5. Violent and continuous struggling



How to assess temperament?

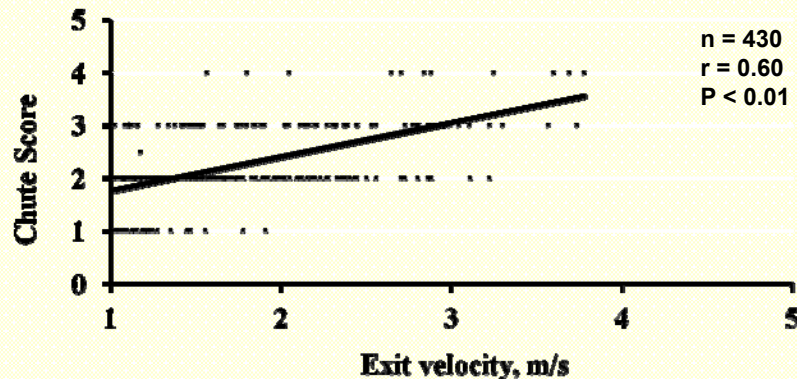
- Exit Velocity or Score
 - Speed of cattle after it leaves the chute
 - Methods for measurement
 - Electronic
 - Establish distance to be traveled by the animal (feet)
 - Measure time (chronometer, infrared sensor in seconds)
 - Classify animals according to speed (feet/second)
 - Visual
 1. Walks away from the chute
 2. Trots away from the chute
 3. Runs away from the chute



How to assess temperament?

Chute Score and Exit Velocity

- Use scores individually
- Average both scores = **Temperament Score**



Cooke et al. (2010)

How to assess temperament?

Temperament type



- Based on Temperament Score
 - **Adequate** temperament ($TS \leq 3$)
 - **Excitable** temperament ($TS > 3$)
- Maintain “some” temperament in the herd
 - Without impairing safety and productive traits
 - Cow-calf systems
 - Pairs survive challenges of extensive environments
 - Feedlot systems
 - Competition for bunk space

Factors that affect temperament

- Sex
 - Females are more temperamental
- Age
 - Young animals are more temperamental
- Production system
 - Range cattle are more temperamental
- Breed type
 - Greatest source of variation
 - Bos indicus cattle are more temperamental

Temperament x Production

What's the relationship?

- Reducing feed intake and nutritional status?
- Physiological effects?
 - Fear-related **stress** responses
 - Including CRH – ACTH - **cortisol** axis
 - Disrupt secretory activity of repro glands
 - Breakdown of muscle and fat tissues =  ADG
 - Nutrient sink =  feed efficiency
- Genetic effects?
 - Deserves further investigation

Temperament x Cortisol

Brangus/Braford replacement heifers



Cooke et al. (2009)

Temperament x Cortisol

Nelore (Bos indicus) Steers



Francisco et al., 2012

Plasma cortisol na/ml

Temperament x Cortisol

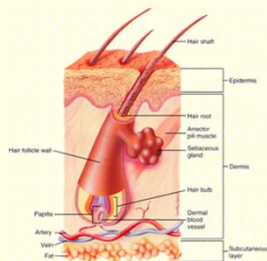


Cooke et al., 2012

Temperament x Cortisol

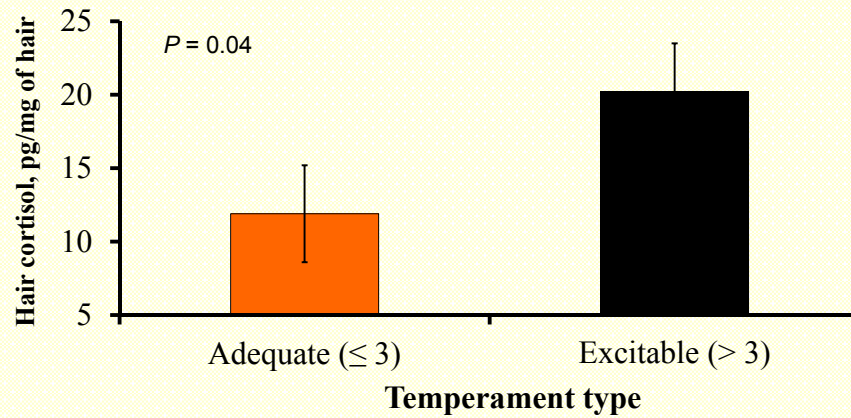
Using hair cortisol as parameter

- Handling for blood collection impacts cortisol
 - Elevated cortisol during handling only?
- Cortisol is accumulated in the hair
 - Retrospective assessment of blood cortisol (30 d)



Temperament x Cortisol

Using hair cortisol as parameter



Basal plasma cortisol concentrations are greater (2x) in cattle with excitable temperament

Cooke et al., 2016

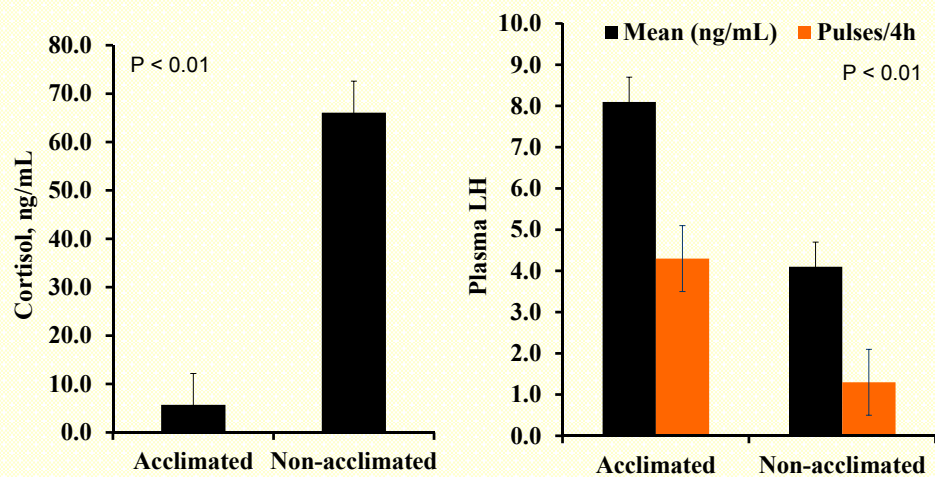
Temperament x Reproduction



Temperament x Reproduction

Physiological effects

Acclimated to human handling = calm temperament



adapted from Echterkamp (1984)

Temperament x Reproduction

Heifers pubertal by 12 mo of age



adapted from COOKE et al, (2009)

Temperament x Reproduction

Braford mature cows

Assessed at beginning of breeding season (90-d bull only)



Temperament score

Cooke et al. (2009)

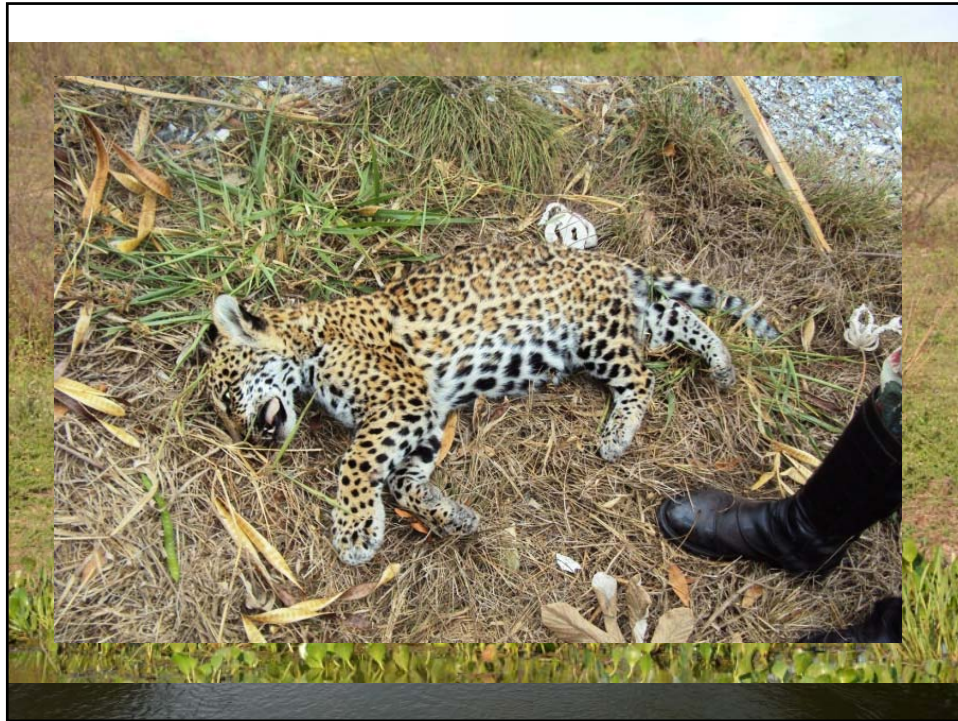
Temperament x Reproduction

Nelore mature cows

Assessed at fixed time AI



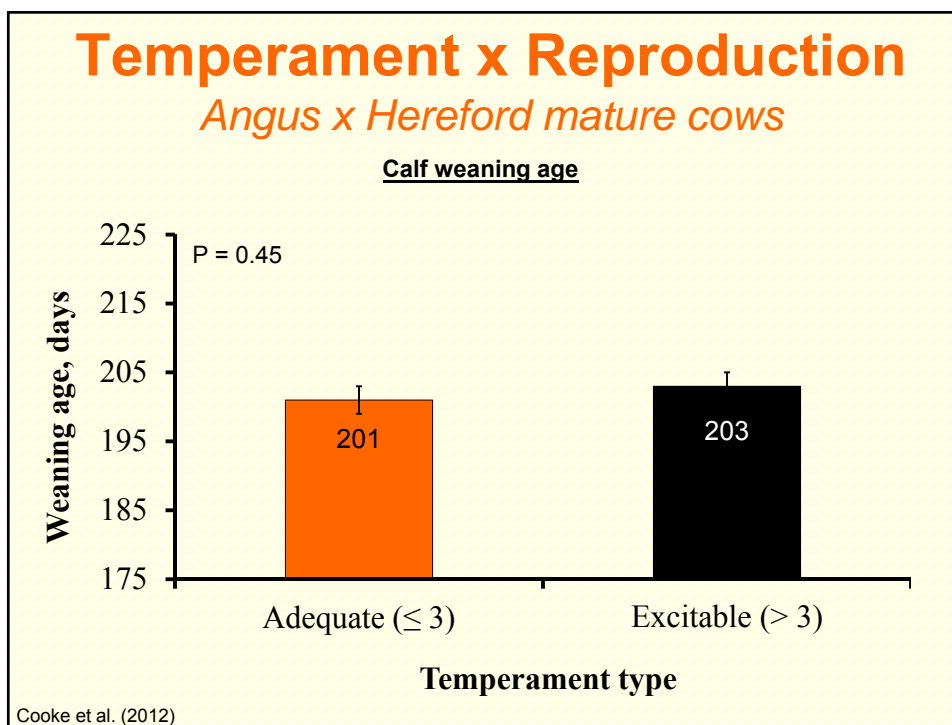
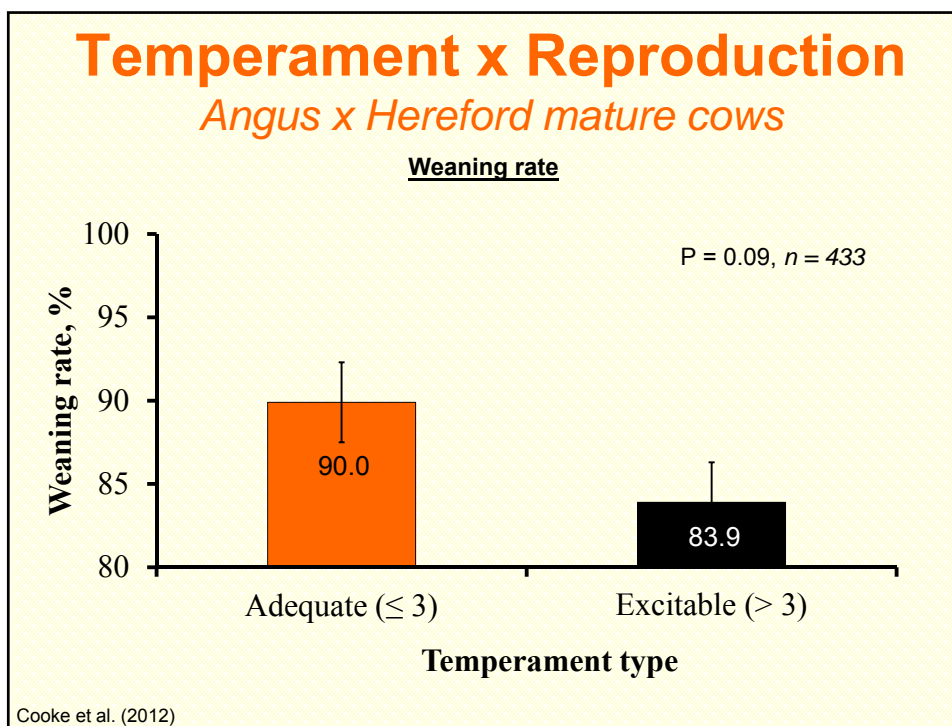
Cooke et al. (2011)



Temperament x Reproduction



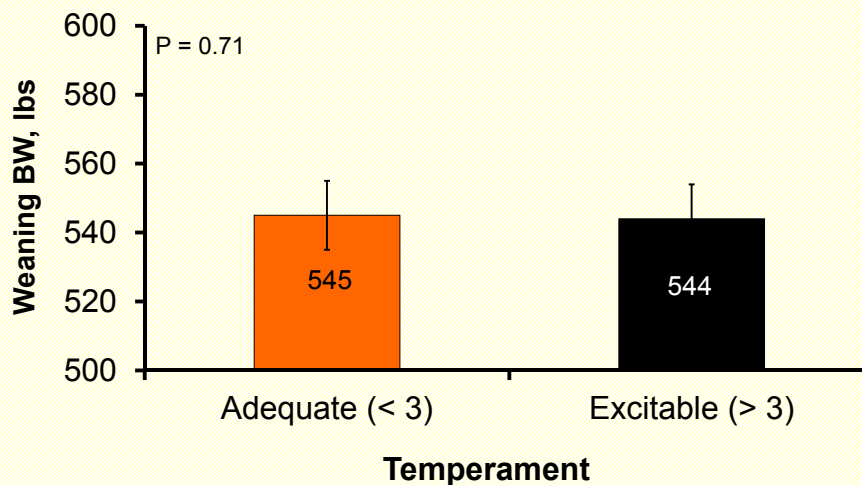
Cooke et al. (2010)



Temperament x Reproduction

Angus x Hereford mature cows

Calf weaning BW

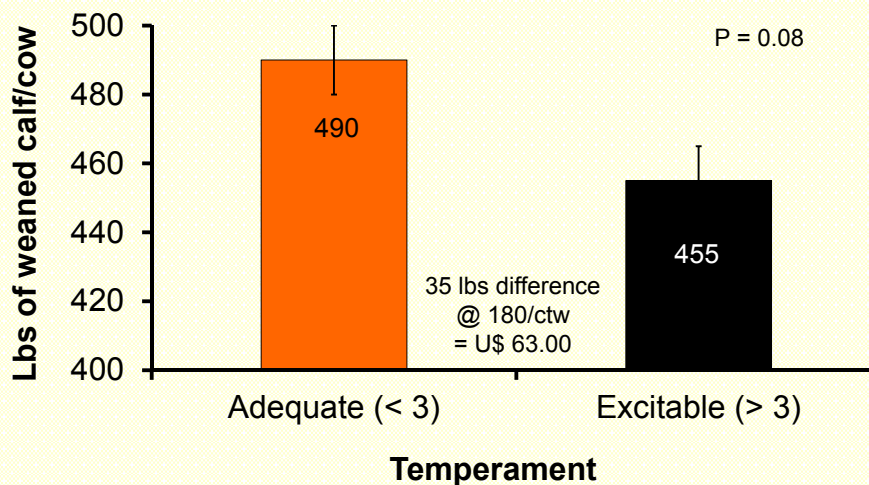


Cooke et al. (2012)

Temperament x Reproduction

Angus x Hereford mature cows

Lbs of weaned calf per cow exposed to breeding



Cooke et al. (2012)

Temperament x Reproduction

- Excitable temperament is detrimental to:
 - Reproductive performance of females
 - Independent of breed
- But how?
 - Nutritional status was accounted in studies
 - Physiological effects (cortisol, *what else?*)
 - Genetic relationship? Still unknown
- Adequate temperament of the cowherd
 - Benefit production in cow-calf operations

Temperament x Feedlot



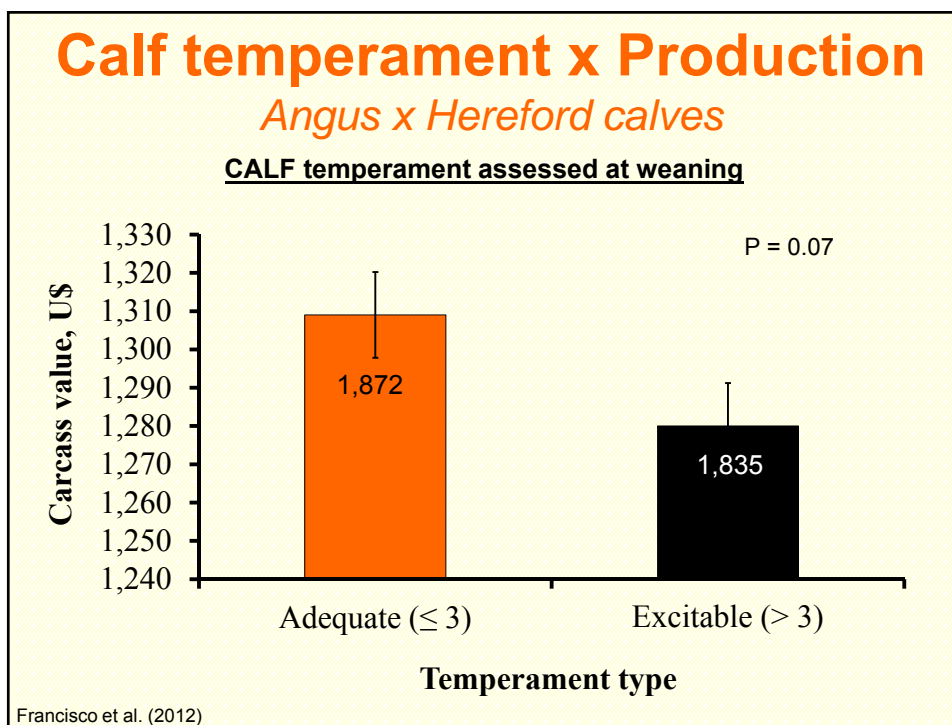
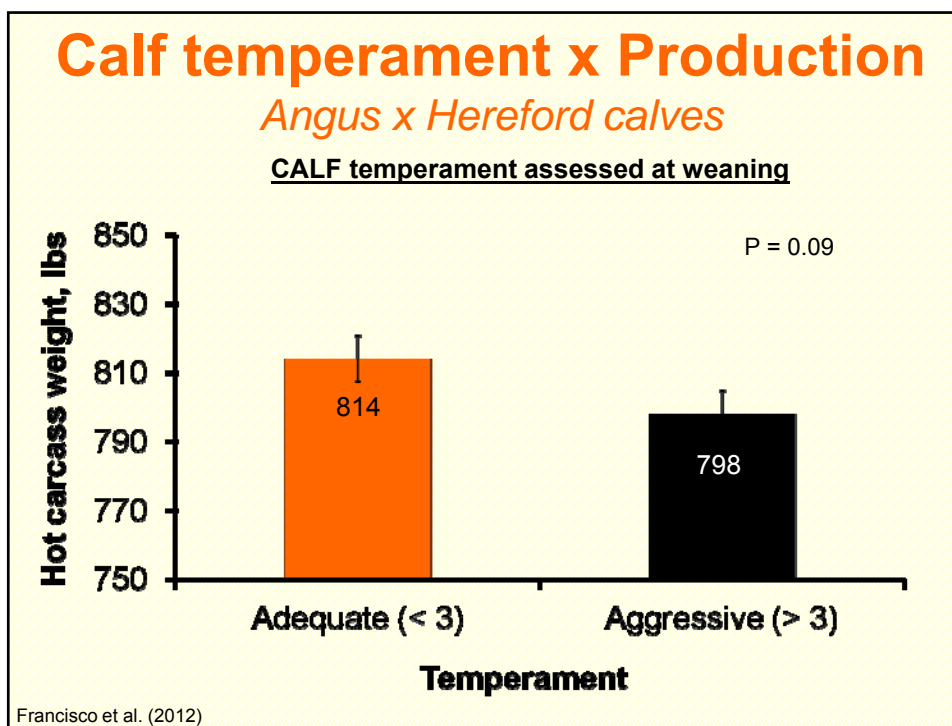


Calf temperament x Production

Angus x Hereford calves



Francisco et al. (2012)



Temperament x Feedlot

Nelore steers

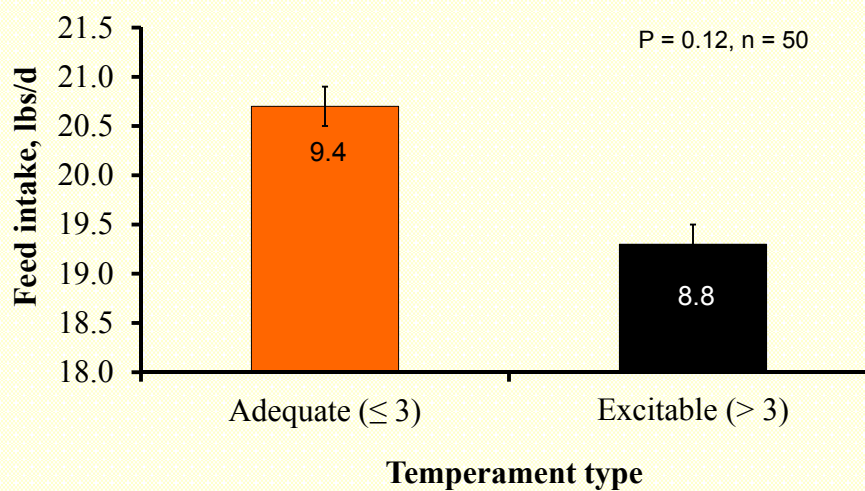


Francisco et al. (2012)

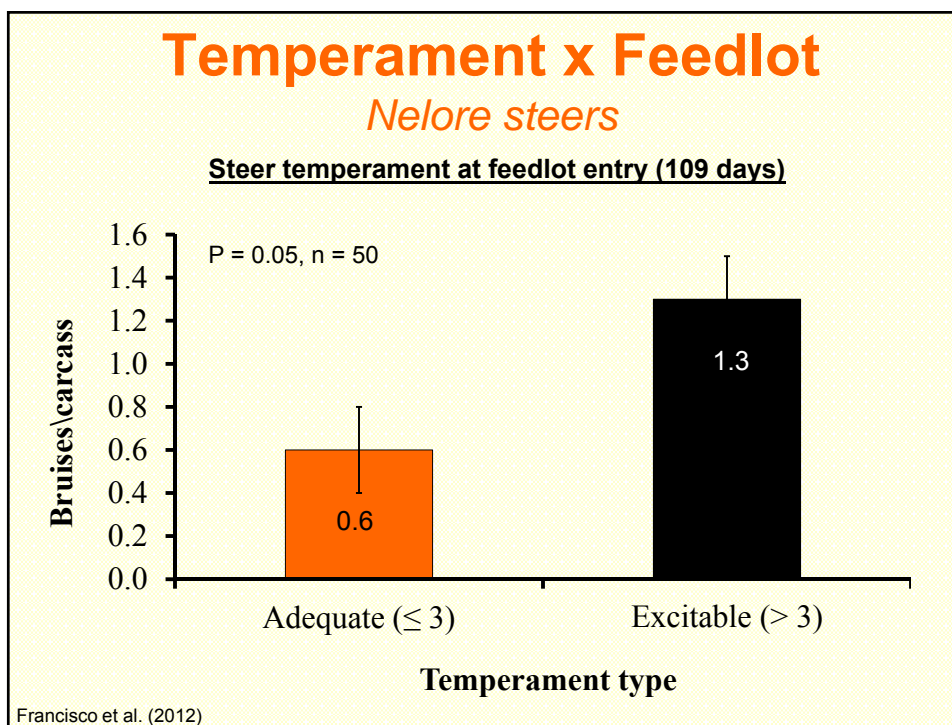
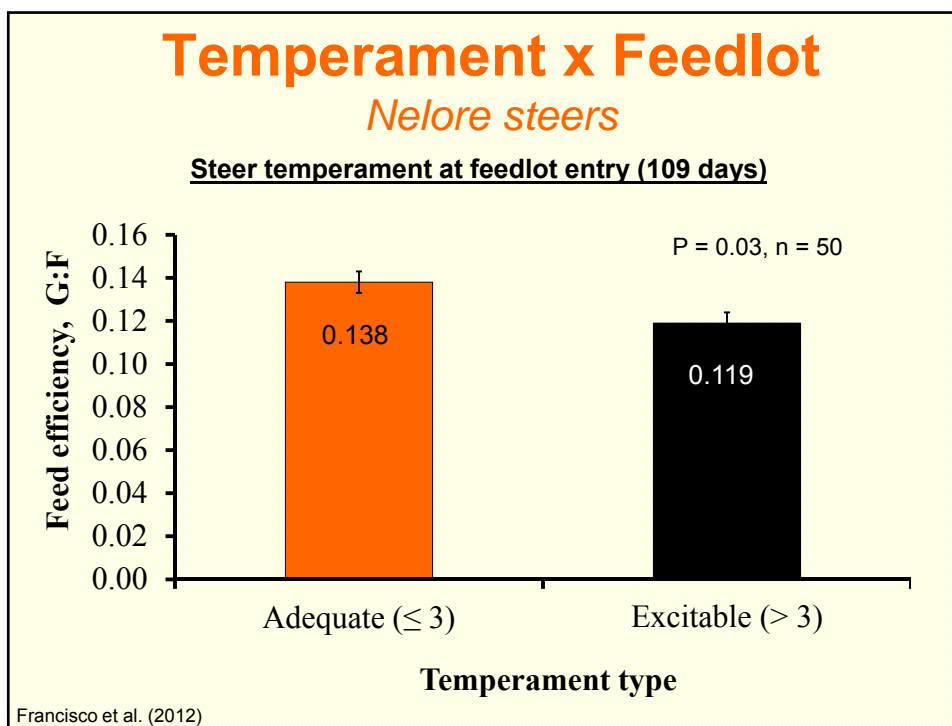
Temperament x Feedlot

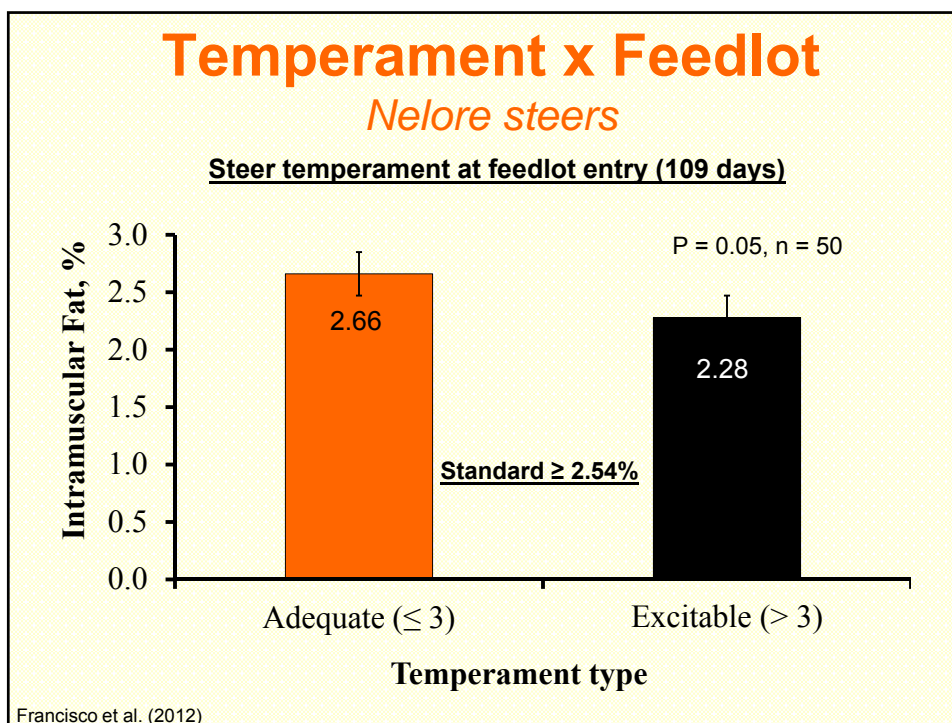
Nelore steers

Steer temperament at feedlot entry (109 days)



Francisco et al. (2012)





Temperament x Feedlot Gain

- Excitable temperament is detrimental to:
 - *Bos taurus*
 - Feedlot performance
 - Carcass weight = carcass value
 - *Bos indicus*
 - Feedlot performance and efficiency
 - Carcass quality
 - Other research groups (various breeds)
 - Feedlot performance, health, vaccine response
 - Carcass quality (marbling, tenderness)

Conclusions

- Excitable temperament impacts:
 - Reproductive and overall efficiency of females
 - Cow-calf production efficiency
 - Performance and carcass quality of feeder cattle
 - Feedlot production efficiency
 - **Overall productivity of the beef industry**
 - **Independent of breed**
- So, what is the connection?
 - Behavioral and physiological effects
 - Genetic relationships?

Conclusions

- Strategies to improve herd temperament
 - Imperative to enhance beef production efficiency
 - Temperament as selection/culling criteria
 - Selection of sires
 - Culling aggressive and unproductive females
 - Maintain “some” temperament in the herd
 - Adequate handling of cattle
 - Aggressive and docile animals

Acclimation of young cattle to human interaction

Improving Temperament

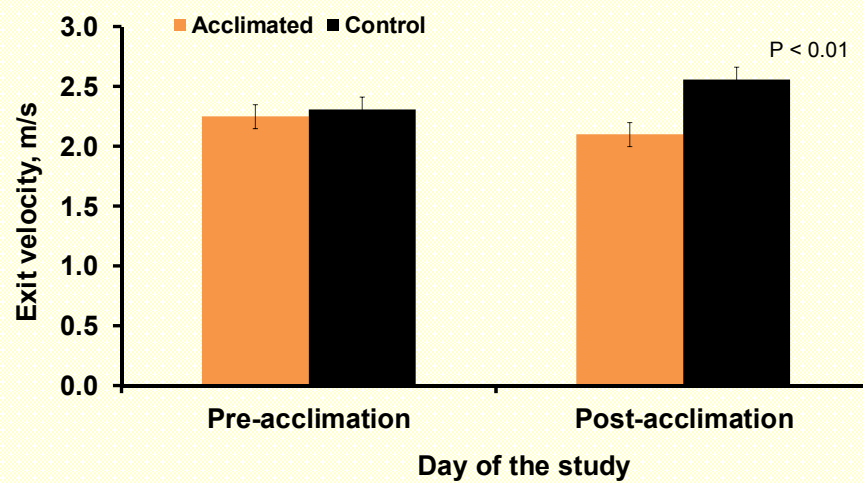
- Acclimate cattle to human handling
 - Research studies conducted at UF and EOARC
- Grazing heifers
 - UF = Brangus/Braford
 - OSU = Angus x Hereford
 - Exposed or not to acclimation after weaning
 - 4 weeks total
 - Brought to the cowpens 3x/week
 - Exposed to common handling procedures
 - Growth, temperament, and reproduction





Acclimation of Heifers - OSU

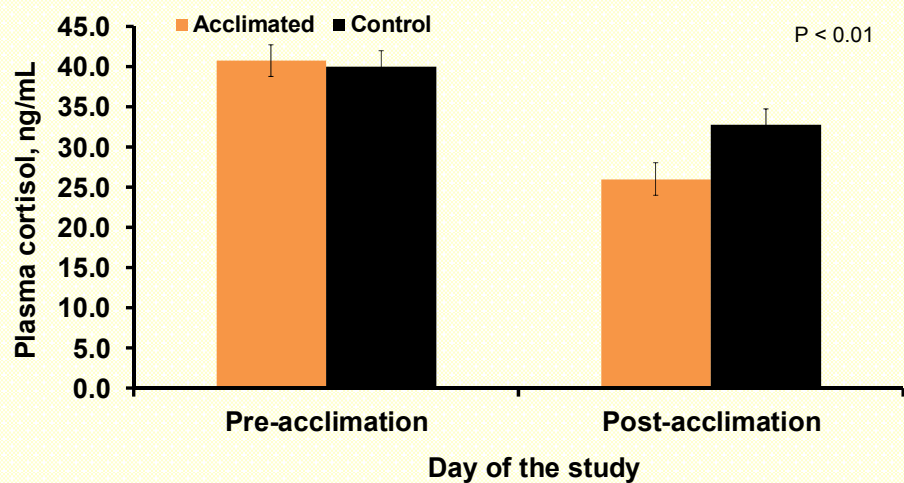
- After the acclimation process



Cooke et al. (2012)

Acclimation of Heifers - OSU

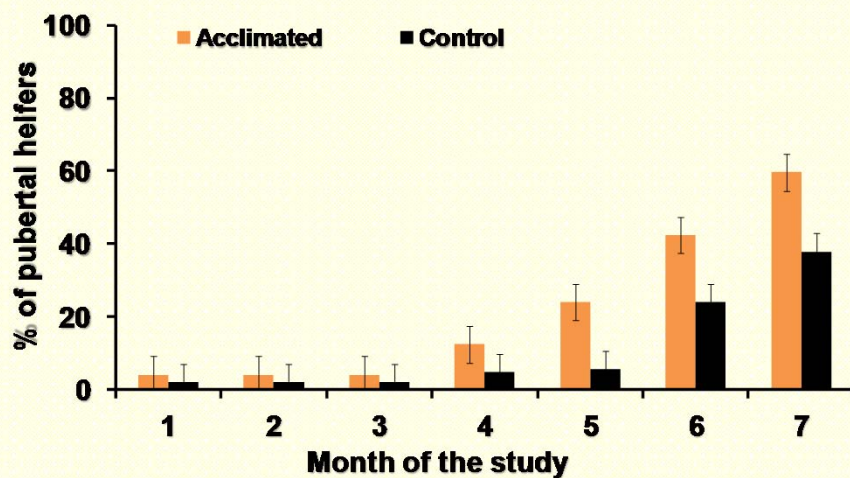
- After the acclimation process



Cooke et al. (2012)

Acclimation of Heifers - OSU

- After the acclimation process



Cooke et al. (2012)

Acclimation of Heifers

- Acclimation of heifers to human handling
 - Decreased cortisol concentrations
 - Hastened reproductive development
 - Independent of breed type
- Effects on mature cows?
 - No positive effects detected
 - Cows often on extensive conditions
 - Improve temperament of mature cowherd
 - Include temperament in selection/culling criteria

Conclusions

- Excitable temperament is detrimental to:
 - **Overall productivity of beef operations**
 - Independent of breed type
- How?
 - Physiological + Genetic effects
 - Additional research needed
- Improve temperament of the cowherd
 - Benefit production in beef operations
 - Selection for temperament / acclimation to handling
 - Environment (stress situations, handling, predators)

Thank you for your attention



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